

RISK MANAGEMENT STRATEGY IN PRIVATIZATION OF EXPRESSWAY PUBLIC CORPORATIONS IN JAPAN

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ABSTRACT

In 2005, four public expressway corporations were privatized, and the Japan Expressway Holding and Debt Repayment Agency (JEHDRA) was established in Japan. The role of JEHDRA is to secure debt repayment within 45 years, to support the expressway companies in the construction of necessary expressways, and to help ensure safe and efficient maintenance.

Since the biggest risk factors in repaying the debt are traffic volume and interest rates, the risk management of these factors is very important. In terms of traffic risk, when there are unexpected social and economic changes, JEHDRA negotiates with the expressway companies and makes appropriate changes in the agreements. Furthermore, to mitigate interest rate risk, JEHDRA is endeavoring to achieve effective liability management by procuring extra long-term funding during low interest rate periods.

A toll discount program for Electronic Toll Collection (ETC) users on holidays, introduced in 2009, resulted in an increase in the number of tourists and helped activating Japanese economy.

1. INTRODUCTION

1.1 Background to Expressway Development

During the 1950's after World War II, road conditions in Japan were very poor. On many roads, large vehicles had difficulty passing each other and, after rainfall, cars got stuck in the mud, even on a main road. Japanese road development was said to be decades behind the developed countries. Road development was given a priority as an essential national project for post-war rehabilitation and industrialization.

However, while the needs for road development was large, the national annual budget for roads was only 62 billion Yen^{*} in the 1950's. The expressway between Tokyo and Kobe alone was estimated to cost about 450 billion Yen.

In response to these circumstances, a toll road system was introduced in 1952 that allowed expressways to be financed with loans and bonds which would be repaid by the toll revenue.

^{*} US\$1 ≈ 94 JPYs (July 2009)

In 1956, the Japan Highway Public Corporation was established to develop the national expressway system. Under new road funding laws, all expressways were developed as toll roads. The construction of the Expressway from Nagoya to Kobe, the first toll expressway in Japan, was financed by a loan from the World Bank.

1.2 Current Situation of the Expressway

The first expressway (71 km long) opened in 1963. After 46 years, about 9,500 km of expressway are now in service and more than 3,000 km is under construction as of April 2009 (see Figure 1). The toll rate for most expressways is determined based on distance traveled. For example, the toll for a passenger car travelling from Tokyo to Osaka is about 11,000 Yen.

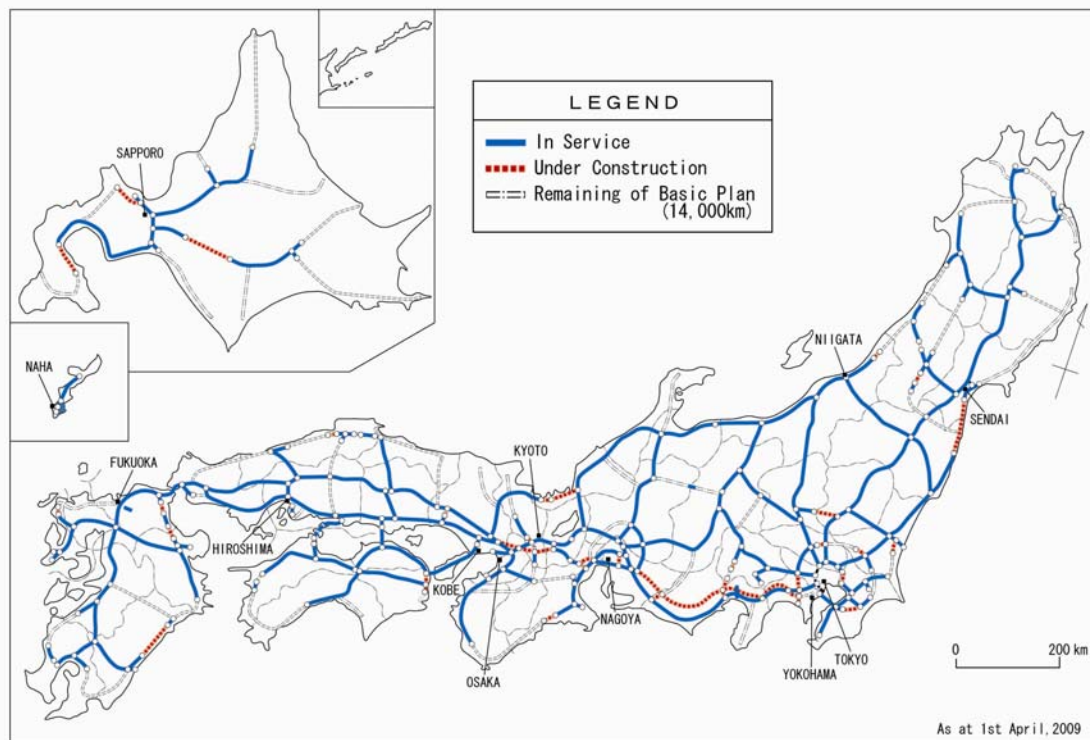


Figure 1. Expressway Network in Japan

2. PRIVATIZATION AND RISK MANAGEMENT STRATEGY

2.1 A New Framework for the Development of Japanese Expressways

As the expressway network extended to rural areas which had less traffic, and to urban areas which required high construction costs, the debt balance of the expressway corporations increased to Yen 40 trillion, and the redemption date of the expressways became later and later.

In 2002, the Japanese Government started studying a new framework for the development of expressways. In 2005, it decided to establish six private expressway companies and one administrative agency called 'Privatization of expressway public corporations'.

The new framework was adopted to limit the amount of debt and to stop a further increase in the burden on the future generations and, at the same time, to build the necessary expressways for the future of Japan.

From this point of view, the new framework has two characteristics: 'Cooperative development of expressways by the Government and private companies' and 'Revenue pooling system'.

2.1.1 Cooperative development of expressway network

Under the new law, the six companies and the agency were required to secure the repayment of all the debt, including new debts derived from the new expressway construction, within 45 years after 2005. This means that, if the debts from a proposed new expressway could not be repaid within the deadline of 45 years, the expressway companies could not build these expressways, and these expressways would have to be constructed by the Government from their annual budget.

Through this alternative and cooperative scheme of construction of new expressways by the Government and the expressway companies, the necessary development can be achieved without overburdening future generations.

2.1.2 Revenue Pooling System

At the early stage of the development of the national expressways, each expressway was treated as a stand-alone project. Their toll rates were determined differently and the debts associated with each expressway were repaid independently.

The revenue pooling system was introduced in 1972, mainly to remove the toll rate differences resulting from the difference construction times. This means that all the revenue from all expressways should be put into one basket, and that some part of the revenue from busy expressways is given to the not-so-busy expressways. This makes it possible to build expressways in areas with less traffic.

This revenue pooling system has been continued within the national expressway network, even in the new framework. Repaying the debt as a network results in mitigation of traffic risk for each expressway.

2.2 Privatization Framework

The major objective of the privatization is to utilize the management knowledge of the private sector and to prepare for the risks surrounding expressway businesses in order to increase the value of expressways and to ensure the repayment of debt.

Four public expressway corporations were transformed into six private expressway companies, along with JEHDRA, an independent administrative agency.

The expressway companies build and operate the expressways and collect tolls. JEHDRA holds the expressway assets and the related debts, leases expressways to the companies and repays the debts with the lease fees received from the companies. The lease fee is determined by setting an amount which is the expected toll revenue minus the expected operation cost. Table 1 shows the result for the fiscal 2007(ending March 31, 2008).

Table 1. Transition of Balance of Debt in Fiscal Year 2007

Item	¥ trillion
Debts at the beginning of fiscal 2007	35.9
Lease fee received	2.0
Interest paid	0.6
New debts received from companies	0.6
Debts at the end of fiscal 2007	35.1

2.3 Risk Management

In order to confirm that all the debt will be repaid within 45 years, 6 private companies and JEHDRA are obligated to make agreements between themselves regarding the applicable toll rates, the expectation of traffic and toll revenue, the expected costs of operation, new construction, and reconstruction, and the expected interest rates.

Table 2. Revenue and Expenditure (45 years)

	Item	¥ trillion
A	Debt (Outstanding balance at the start of FY 2005)	41.6
B	New Construction and Reconstruction Cost	22.0
C	Operation Costs	31.7
D	Interest Payment	35.7
	Total	131.0
E	Toll Revenue	128.5
	Other	2.5

The expressway business is, however, affected by many risk factors. Therefore the companies and JEHDRA are required to reevaluate, about every five years or at any time when circumstances change, the risk factors, and to make necessary revision to the agreements in order to secure the repayment of debts.

Since a change of the traffic volume and that of interest rates are major risks, some measures of mitigating these risks have been introduced.

2.3.1 Traffic Risk

Reflecting the recent changes in economic factors such as birth rate, growth rate of GDP and the price of gasoline, the Ministry of Land, Infrastructure, Transportation and Tourism revised the Forecast of Future Traffic Demand in November 2008. It suggests that the Japanese traffic demand in future might be smaller than the one suggested in the last Forecast which the agreements were based on.

In general, however, the traffic growth rate correlates positively with the growth rate of the economy: a low growth rate in the economy basically means that the interest rates would be kept low (Figure 2).

Therefore if agreements are made carefully and conservatively, and take into account the correlation between traffic and interest rates, it works as a risk mitigation function to some extent. In revising agreements the cost of operation and construction and toll rates may have to be reviewed if necessary.

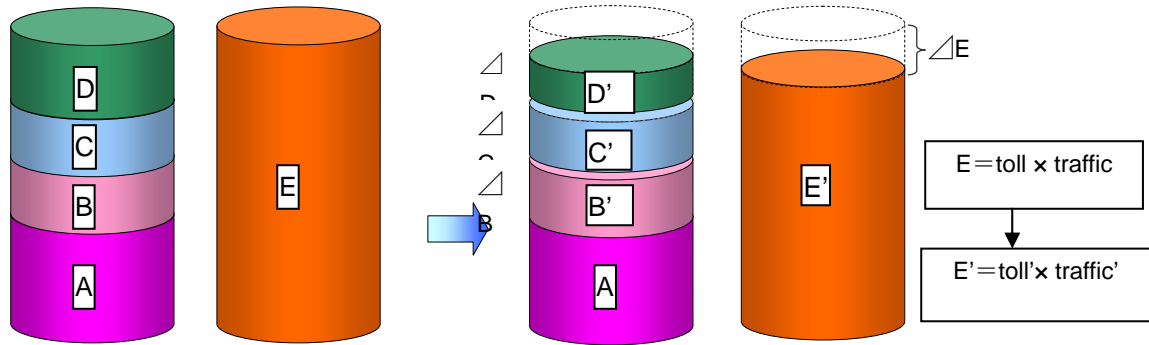


Figure 2. Risk mitigation mechanism in the case of less traffic

In addition, 'variable lease fee' has been introduced to soften the impact of traffic risk affecting the financial state of expressway companies. In case of a sudden and unforeseeable increase or decrease in traffic, the lease fee is to be adjusted and preparation for new agreements may begin.

2.3.2 Interest Rate Risk

In order to confirm the repayment of debt, JEHDRA determines carefully and conservatively the growth rate of the economy and the interest rate over 45 years to be used for agreements. In the outstanding agreements, JEHDRA adopted the conservative premise that the interest after 2009 would be 4%.

JEHDRA has made an effort to reduce the risk of an increase in interest. In 2005 JEHDRA issued 40-year fixed-interest bonds; this was the first ever type of bond in the Japanese bond market. JEHDRA has continued to issue longer-than-20-years fixed interest bonds taking advantage of situations where the interest rate stays relatively low.

As well as the Government guaranteed bonds, around 70% of FILP Agency bonds[†] issued in fiscal 2008 were bonds with maturity dates longer than 20 years.

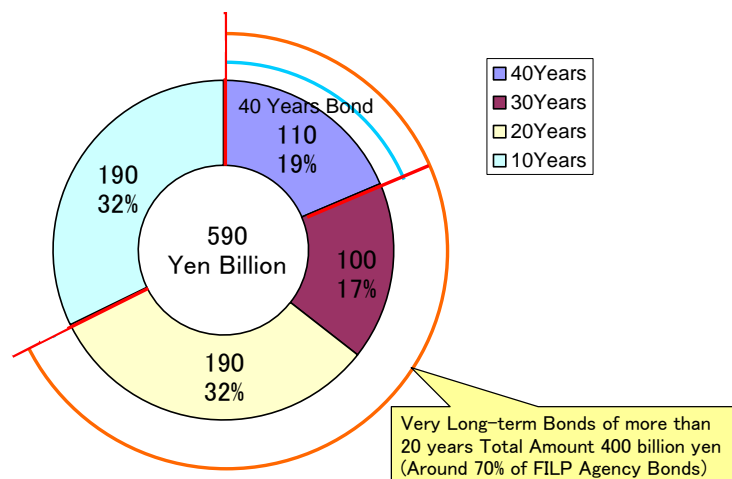


Figure 3. Financing situation of FILP agency bonds

[†] FILP Agency Bonds are publicly-offered bonds issued by special corporations and Administrative Agencies, including JEHDRA, under the Fiscal Investment and Loan Program of the Government of Japan.

2.3.3 Force Majeure risks

Japan is subject to frequent earthquake damage. Although very high design standards are applied for earthquakes, there have been unexpected disasters such as the Hanshin Earthquake in 1995. To cope with natural disasters such as earthquakes, the Japanese Government is required to supply the necessary funds to repair the damage.

For example, the Hokuriku expressway was damaged in 330 locations along 95 km of the expressway on July 16, 2007 because of an earthquake in the Japanese Sea. JEHDRA and the East Nippon Expressway company received 8.5 billion Yen to repair the damage.

3. Economic Stimulus Package for the Fiscal Year 2008 (Toll discount and construction of Smart Interchanges by national budget)

3.1 Purpose and Overview

Toll levels on expressways in Japan are higher than those in other countries. It has been said that this has resulted in high freight transportation costs in Japan and a loss of competitiveness in the international market. Although the expressway companies discounted the toll rate by 10% after privatization in 2005, many people believed that it was still not enough. Typically some sections of the expressways provide smooth traffic flow, while at the same time parallel sections of free highways are congested during peak hours. As a result, the Government commenced social experiments by discounting toll in many sections. In May 2008 it enacted a law which authorized the use of the national budget to discount expressway tolls.

As a result of the sharp increases in oil prices and the global financial crisis, the Government decided to introduce a large expressway toll discount program as part of the economic stimulus package. Three trillion Yen will be used for toll discounts over ten years and for the construction of Smart Interchanges (ICs) which are exclusively for Electronic Toll Collection (ETC) users. Of this, 500 billion yen will be used exclusively for toll discounts over the first two years.

One political party claims that all expressways should be toll free except in urban areas and that the expressway debt should be transferred to the Government and the operation and maintenance costs of the national expressway network should be funded by toll revenues earned from the expressways in the urban areas.

3.2 Funding of the Program

The funding scheme is as follows (see Figure 4):

- ☐ the Government accepts the JEHDRA debt
- ☐ JEHDRA discounts the lease fees of the expressway companies
- ☐ the expressway companies discount equivalent tolls and construct Smart ICs.

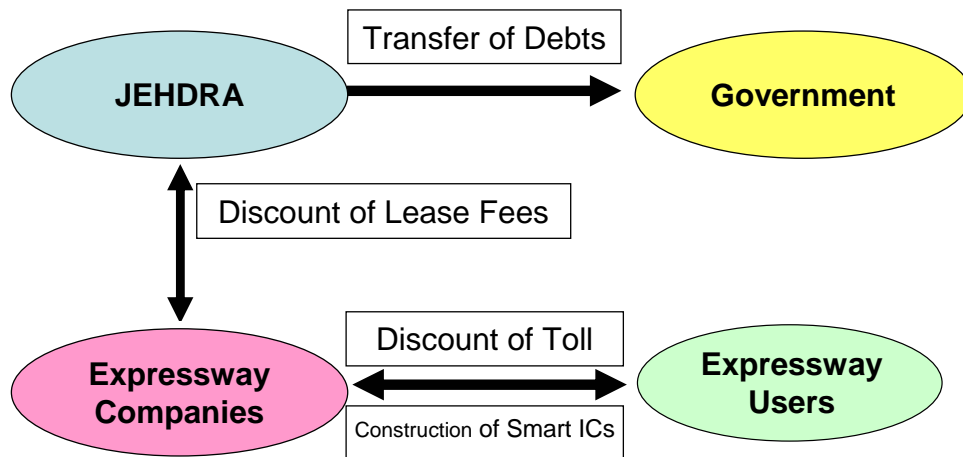


Figure 4. Scheme of funding of the programs

Under the Government initiative, JEHDRA and the expressway companies jointly make up the program with public consultation via the internet. The performance of the program is continuously monitored by checking actual traffic, the toll revenue and the use of the expressways to ensure effectiveness of the program.

3.3 Toll Discount Program

The discount program is divided into three categories according to their purposes.

The first category is a discount for regional development, especially for tourism. On holidays, tolls for passenger cars are discounted by 50% with a cap of Yen 1000 in rural areas (Figures 5 and 6). In the urban areas of Tokyo and Osaka, tolls are discounted by 30-50%. On urban expressways in Tokyo and Osaka, tolls are discounted by 30% to Yen 500. The economic impact of this holiday discount program is estimated to be Yen 700 billion.

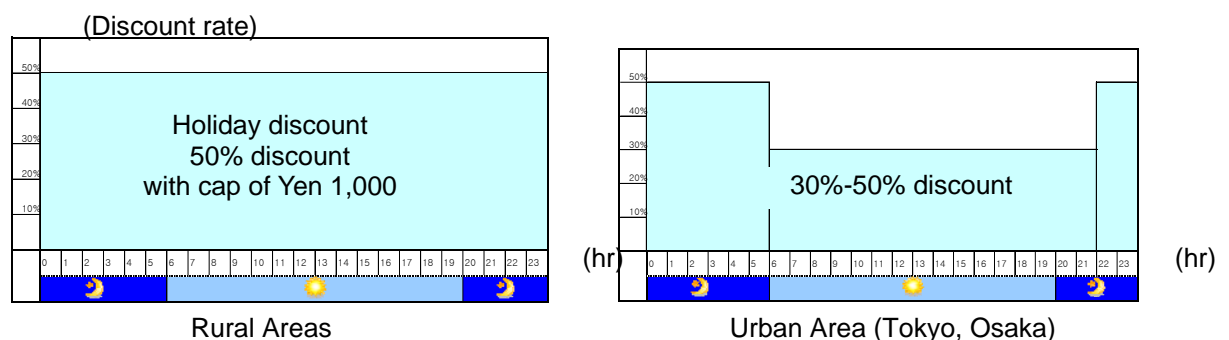


Figure 5. Holiday discount toll (passenger cars)

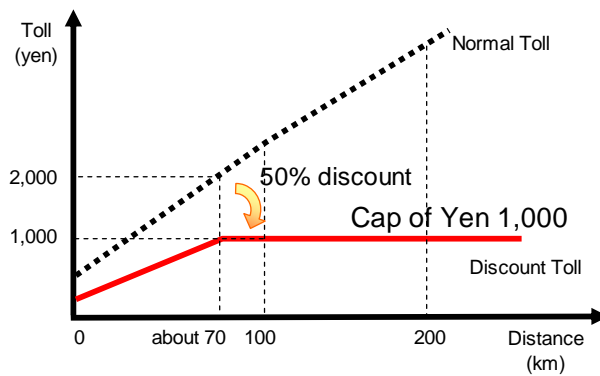


Figure 6. Toll and travel distance with cap of Yen 1,000

The second category is for efficient freight transportation. Since trucks use expressways on weekdays, especially during evenings and at night, a 30% minimum discount is applied to weekday usage and a 50% discount is applied to after-midnight usage in rural areas (Figure 7).

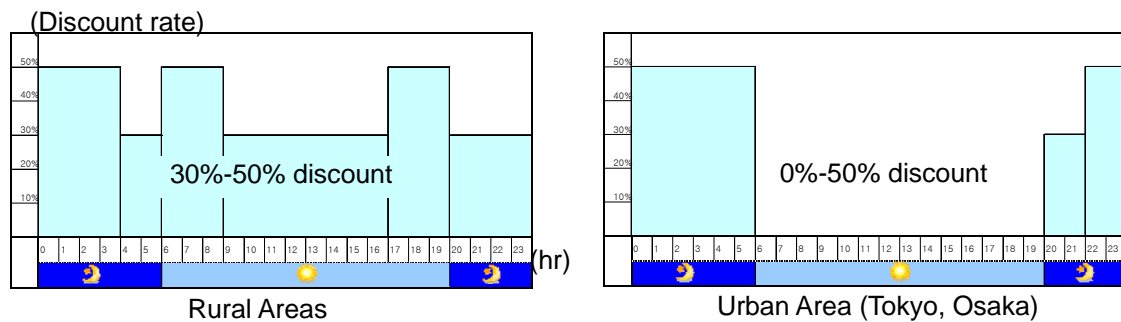


Figure 7. Weekday discount of toll (passenger cars and trucks)

The third category is to mitigate serious congestion in the big cities. A 30% discount is applied to the ring roads to lead traffic away from the central business districts in the Tokyo and the Osaka areas (Figure 8). Since the total annual toll revenue of the expressways is Yen 2.5 trillion, the average discount is approximately 20% for the first two years and 10% for the following eight years.

The discount rate was applied to nation-wide expressways and there was a big response from the public. Many media outlets noted the increase in traffic and the number of visitors to the many tourist locations.

Traffic during holidays especially increased because the holiday discount has a cap of Yen 1000, which was more than 90% off the regular price in some cases. It can be interpreted that the discount removed the 'mental barrier' for people who had a desire to visit various spots in remote locations but had not done so because of the high tolls.

During the "Golden Week" from April 25 to May 6, many people take vacations, and the traffic increased by 30% in rural areas, and 10% in urban areas compared with last year (Table 3).

This means that more people drove to more distant destinations, especially in the rural areas. According to the user questionnaire survey conducted by the expressway companies, 61% of expressway users made their trips because of the discount program (Figure 9).

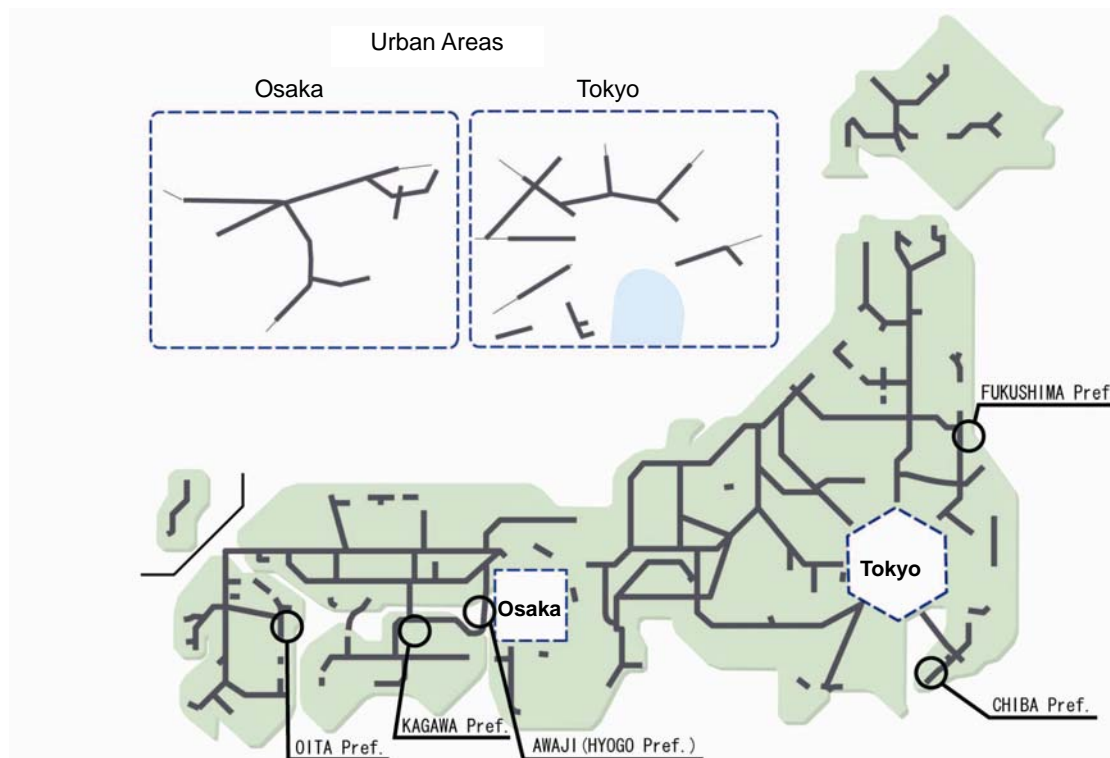


Figure 8. Toll discount area category

Q. Did the Holiday discount help decide your trip?

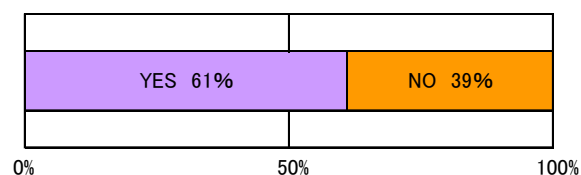


Figure 9. Expressway users recognition regarding effectiveness of toll discount

The number of visitors to many sightseeing locations near the expressways increased in spite of a decrease in the total number of tourists resulting from the economic recession. Local Government and tourism associations in many areas ran tourism campaigns to utilize the holiday discount. They distributed their local products as free gifts and provided a discount on their services to attract visitors to their area.

Another economic impact is that, since this discount program is only for the users of ETC, the sales of the ETC on-board units have sharply increased. In Japan, all expressways use the same ETC system which makes it possible to instantly calculate actual tolls based on time, route, distance and frequency of use in any part of the nation.

After the public announcement of the discount program, one million ETC on-board units were sold in one month and the total number of the cars equipped with ETC units now totals 30 million out of 80 million cars in Japan. The proportion of ETC payment is now over 80% with the sharpest increase noted during holidays.

Table 3. Changes of Numbers of Visitors to Some Locations during Golden Week

Prefecture	Name of Facility	Category	Change from last Year (number of visitors)	Change in Daily Traffic from last year on Related Expressways
Fukushima	Aquamarine Fukushima	Aquarium	106% (91,000 in 12 days)	112% Joban Expressway (Iwaki-Nakoso Joban-Tomioka)
Chiba	Mother Farm, Kamogawa, SeaWorld, etc.	Zoo, etc.	115% (460,000 in 12 days)	121% Tokyo Bay Aqua Line
Hyogo	Akashi Kaikyo Park (Awaji district)	Park	116% (48,000 in 8 days)	139% Kobe-Awaji-Naruto Expressway
Kagawa	New Leoma World	Amusement Park	125% (150,000 in 12 days)	180% Seto Chuo Expressway
Oita	Beppu Hell Tour	Scenery	124% (67,000 in 8 days)	128% Oita Expressway (Kuju~ Yufuin)

12 days: 25 April 2009-6 May 2009; 8 days: 29 April 2009-6 May 2009.

On the negative side, many sections were congested where there had been no congestion in the past. Also, the number of users of the Shin-Kansen (Bullet Train) and ferry boats, which are the competitors of the expressways, decreased during the same period.

3.4 Additional Interchanges - Smart ICs

The average distance between Interchanges (ICs) of expressways in Japan is 10 km, which is twice as long as western countries. It has been said to be an obstacle to the effective use of expressways because it is difficult to divert traffic from a congested expressway. It also takes longer to access an entrance, thereby lessening the time saving benefit of the expressway. It is also difficult for an ambulance to use an expressway in case of an emergency.

To cope with these problems, the Government decided to construct additional low cost ICs only for ETC users. These ICs are called Smart ICs. They commenced as a social experiment in 2004 and were converted to permanent ICs in October 2006.

The aim of this program is to develop about 200 ICs in densely populated areas, industrialized areas, and in rural areas without ICs in order to catch up with the western countries in terms of average distance between ICs. Although local Government will take the initiative in this program, the national Government has been authorized to disburse Yen 300 billion for this program. Expressway companies pay for the toll collection facilities and their operation as well as maintenance costs.

The configuration of a Smart IC access to a parking area is shown in Figure 10.

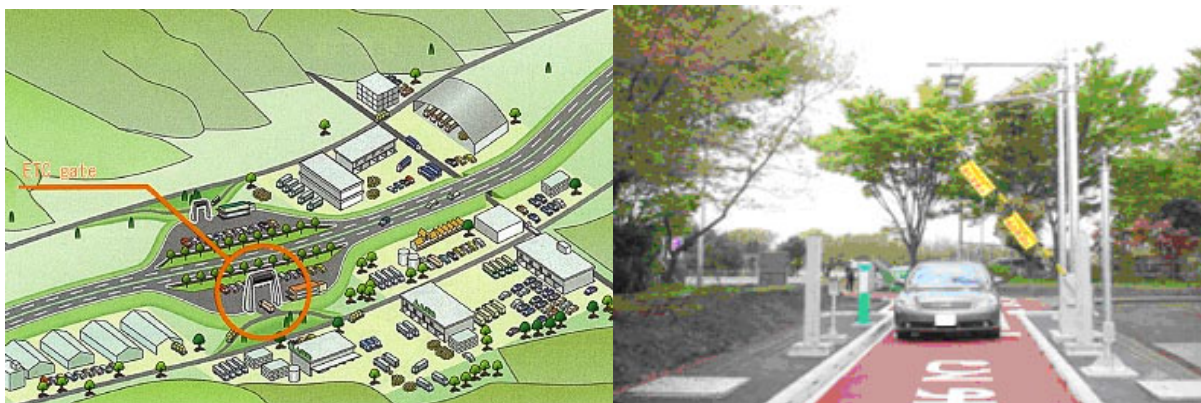


Figure 10. Configuration of a Smart IC access to a parking area

4. Economic Stimulus Package for the Fiscal Year 2009 (Widening of expressways to four lanes using national budget)

As an additional program in the economic stimulus package for the fiscal year 2009, the Government decided to widen 190 km of two-lane expressway to four lanes at a cost of Yen 300 billion. In Japan, some sections of expressway with low traffic volume (about 1,600 km out of 7,641 km), were temporarily constructed with only two lanes to reduce the initial cost and to shorten the construction time.

This main aim of the program is to address two problems associated with two-lane expressways. The first problem is the higher fatal traffic accident rates than four-lane expressways. The second problem is the higher risk of closing expressways as a result of natural disasters. If a section with four lanes is half damaged by a natural disaster, this can be managed and remain open during repair work by using the less damaged lanes. A two-lane expressway has to be completely closed for repairs. The joint development scheme will be utilized for all of these sections for securing financial balance.

5. Development of Advanced Technology

The ETC system in Japan, which has been implemented since 2001, has contributed to reducing traffic congestion at toll gates and carbon gas emissions by providing no-stop payment of tolls. The congestion at the toll gates used to constitute 30% of all congestion; this has decreased dramatically following the introduction of the ETC.

The ETC system has both high security and errorless communications as well as other advantages, such as automatic payment of parking charges and automatic check-in and payment of ferry boats, which have recently been started.

The ETC system in Japan utilizes an active system (ARIB) where an on-board unit in each vehicle receives and sends electronic radio waves between antennas. Since the on-board unit has a battery, the correspondence time is shorter, the effective communication area is wider, and the data volume is larger than the passive system (CEN) which is used in the European countries. Japan proposes a global ETC system which has broad application possibilities in Asia. Since the global ETC has large memory and can apply longer IDs for a vehicle, the same on-board unit can be used for cross-border traffic which is impossible in Europe. In addition, a system has been developed where an on-board unit has multi functions including ETC, VICS (Vehicle Information and Communication System) and

other safety information services by utilizing the large memory dual direction communication features. In this system, a vehicle can receive text, sound, and graphic data, and use it for on-line collection of information while driving on highways which have beacons.

Additionally, solar powered generation systems will be installed in rest areas and used as energy for expressway operation. A new alert system for stopping cars driving in the wrong direction has been recently implemented. These sort of mistakes are on the increase because, in Japan, the population is ageing and many of them are not familiar with expressway operation. This system has a sensor and shows caution signs to stop drivers who try to enter to an expressway from an exit.

6. CONCLUSIONS

- ☐ The main factors associated with the toll road business are traffic and interest rate risks.
- ☐ Traffic risk can be mitigated by rebalancing the repayment plan by reducing construction and operation costs, etc.
- ☐ The interest risks are hedged by liability management where long term fixed interest bonds are issued. Recently, a number of programs have been introduced for the effective and efficient use of expressways and economic stimulus.
- ☐ Toll discounts facilitated an increase in traffic and visitors to sightseeing locations in rural areas.
- ☐ Advanced technologies are being utilized in ETC and other expressway facilities.